CLAIMS:

said pressure operable device.

| 1 | 1. A safety shutoff apparatus for closing a valve, comprising: |
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| 2 | a pressure operable device coupled to said valve for acting upon said |
| 3 | valve; |
| 4 | a pressure line having a distal port and a proximal end, the proximal end |
| 5 | of said pressure line being coupled to said pressure operable device for applying |
| 6 | fluid pressure thereto in order to operate said pressure operable device; and |
| 7 | a soluble plug at the distal port of said pressure line for sealing said |
| 8 | pressure line in order to maintain if the pressure through said pressure line at |

- 2. A safety shutoff apparatus according to claim 1 wherein said pressure operable device is operable to keep said valve open in response to pressure in said pressure line exceeding 5 psi.
- 3. A safety shutoff apparatus according to claim 1 wherein said pressure line is longer than 30 cm.
- 4. A safety shutoff apparatus according to claim 1 wherein said pressure line has a first port and a second port communicating with said pressure operable device, said soluble plug including a first and a second soluble seal mounted at said first and said second port, respectively.
- 5. A safety shutoff apparatus according to claim 1 wherein said pressure line has a first branch and a second branch communicating with said pressure operable device, said soluble plug including a first and a second soluble seal mounted distally in said first and said second branch, respectively.
- 6. A safety shutoff apparatus according to claim 1 wherein said pressure line has a service branch terminating with a fitting adapted to connect to a

- 3 source for pressurizing said pressure line. 1 7. A safety shutoff apparatus according to claim 1 comprising: 2 a pump for pressurizing said pressure line. 1 8. A safety shutoff apparatus according to claim 1 comprising: 2 a sleeve attached to said pressure line, said soluble plug being mounted 3 in said sleeve. 9. A safety shutoff apparatus according to claim 8 wherein said sleeve 1 2 has an internal seal coating for sealing said soluble plug to said sleeve. 1 10. A safety shutoff apparatus according to claim 8 wherein said sleeve 2 has a fitting for coupling said sleeve to said pressure line. 1 11. A safety shutoff apparatus according to claim 8 wherein said sleeve has a fitting for detachably coupling said sleeve to said pressure line. 2 1 12. A safety shutoff apparatus according to claim 8 wherein said sleeve 2 has an inner chamber and a larger outer chamber, said soluble plug being 3 mounted in said larger outer chamber, said safety shutoff apparatus comprising: 4 a stopper slidably mounted in said inner chamber between said soluble 5 plug and said pressure line. 1 13. A safety shutoff apparatus according to claim 8 wherein said sleeve 2 has an inwardly diverging throat containing said soluble plug. 1 14. A safety shutoff apparatus according to claim 8 wherein said sleeve
 - 15. A safety shutoff apparatus according to claim 1 comprising:

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has a plurality of side orifices.

| 2 | a biasing device for urging said valve to close. |
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| 1 | 16. A safety shutoff apparatus according to claim 1 comprising: |
| 2 | a catch for normally preventing closure of said valve, said pressure |
| 3 | operable device being operable to release said catch and allow closure of said |
| 4 | valve. |
| 1 | 17. A safety shutoff apparatus according to claim 16 comprising: |
| 2 | a spring for urging said valve to close. |
| 1 | 18. A safety shutoff apparatus according to claim 16 wherein said valve |
| 2 | has a rotatable operating handle with an opening, said catch normally engaging |
| 3 | said opening in said handle, said catch being retractable from said opening to |
| 4 | release said handle. |
| 1 | 19. A safety shutoff apparatus according to claim 16 wherein said valve |
| 2 | has a rotatable operating handle, said catch comprising: |
| 3 | a pin mounted to retract relative to said handle in an axial direction. |
| 1 | 20. A safety shutoff apparatus according to claim 16 wherein said valve |
| 2 | has a rotatable operating handle, said catch comprising: |
| 3 | a cam rotatably driven by said pressure operable device to retract relative |
| 4 | to said handle. |
| 1 | 21. A safety shutoff apparatus according to claim 16 wherein said valve |
| 2 | has a rotatable operating handle, said catch comprising: |
| 3 | a lever rotatably driven by said pressure operable device to retract relative |
| 4 | to said handle. |
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22. A safety shutoff apparatus according to claim 16 wherein said

pressure operable device comprises a pneumatic cylinder.

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| 1 | 23. A safety shutoff apparatus according to claim 1 wherein said valve |
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| 2 | has an operating handle, said safety shutoff apparatus comprising: |
| 3 | a spring coupled to said handle for urging said valve to close. |
| 1 | 24. A safety shutoff apparatus according to claim 23 wherein said spring |
| 2 | is an extension spring coupled to said handle to swing it. |
| 1 | 25. A safety shutoff apparatus according to claim 24 wherein said valve |
| 2 | has a pipe, said safety shutoff apparatus comprising: |
| 3 | a standoff adapted to clamp to said pipe, said spring being stretched |
| 4 | between said standoff and said handle. |
| 1 | 26. A safety shutoff apparatus according to claim 1 comprising: |
| 2. | a torsion spring mounted to apply a torque to said valve in a manner that |
| 3 | tends to close said valve. |
| 1 | 27. A safety shutoff apparatus according to claim 26 wherein said valve |
| 2 | has a movable member, said safety shutoff apparatus comprising: |
| 3 | a stator mounted at said valve with restricted ability to rotate, said stator |
| 4 | having an inner and an outer flange; and |
| 5 | a rotor mounted about said stator adjacent said inner flange, said torsion |
| 6 | spring being mounted on said stator and being coupled between said outer |
| 7 | flange and said rotor in order to drive them toward a neutral relative angular |
| 8 | orientation, said rotor being coupled to said movable member of said valve, said |
| 9 | spring being mounted in a position tending to rotate said movable member of |
| 10 | said valve in a predetermined direction. |

can be angularly adjusted to change the angular orientation between said outer flange and said rotor when in the neutral relative angular orientation.

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28. A safety shutoff apparatus according to claim 27 wherein said spring

| 1 | 29. A safety shutoff apparatus according to claim 28 wherein said stator |
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| 2 | has an abutment arm to engaging stationary structure on said valve, said rotor |
| 3 | having a driving arm for engaging the movable member of said valve. |
| 1 | 30. A safety shutoff apparatus according to claim 1 wherein said |
| 2 | pressure operable device comprises a pneumatic cylinder. |
| 1 | 31. A safety shutoff apparatus according to claim 1 wherein said |
| 2 | pressure operable device comprises a bellows. |
| 1 | 32. A safety shutoff apparatus according to claim 1 wherein said |
| 2 | pressure operable device comprises a bladder. |
| | |
| 1 | 33. A safety shutoff apparatus according to claim 1 wherein said |
| 2 | pressure operable device comprises a vessel with an inlet and a diaphragm, said |
| 3 | vessel being pressurizable through said inlet to distend said diaphragm. |
| 1 | 34. A safety shutoff apparatus according to claim 1 comprising: |
| 2 | an accumulator for stabilizing pressure in said pressure line. |
| 1 | 35. A safety shutoff apparatus according to claim 34 wherein said |
| 2 | accumulator comprises: |
| - 3 | a chamber having an inflatable member. |
| - | a chamber having an innatable member. |
| I | 36. A safety shutoff apparatus according to claim 34 wherein said |
| 2 | accumulator comprises: |
| 3 | a chamber having a spring biased piston. |
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37. A method for closing a valve with a pressure operable device that is

coupled to a pressure line having a distal port sealed with a soluble plug,

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| 3 | comprising the steps of: |
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| 4 | pressurizing said pressure line sufficiently to cause the pressure operable |
| 5 | device to maintain the valve in an open condition; |
| 6 | contemporaneously placing the soluble plug next to an object that is |
| 7 | subject to leaking to allow in response to leaking from said object dissolution of |
| 8 | said soluble plug and release of pressure in said pressure line; and |
| 9 | closing the valve when mechanical movement is produced by the pressure |
| 0 | operable device in response to pressure being released from said pressure line. |
| 1 | 38. A method according to claim 37 comprising the step of: |
| 2 | routing said pressure line with at least two branches serving different |
| 3 | objects subject to leaking, each of the branches being sealed with a soluble |
| 4 | plug. |
| 1 | 39. A method according to claim 37 wherein the pressure line has at |
| 2 | least two soluble plugs, the method comprising the step of: |
| 3 | routing said pressure line with the at least two soluble plugs serving |
| 4 | different objects that are subject to leaking. |
| 1 | 40. A method according to claim 37 wherein the step of pressurizing the |
| 2 | pressure line is performed by creating a pressure of no more than 5 psi. |
| 1 | 41. A method according to claim 37 comprising the step of: |
| 2 | periodically repressurizing the pressure line. |
| 1 | 42. A method according to claim 37 wherein the valve is biased to close, |
| 2 | the method comprising the step of: |
| 3 | placing a catch in a position to prevent closing of the valve; and |
| 4 | releasing the catch using the pressure operable device. |